3. The semiconductor laser diode of claim 2 in which the waveguide region has a doping level of no greater than $5\times10^{16}/cm^3$.

4. The semiconductor laser diode of claim 3 in which the materials of the waveguide region and the clad regions have a refractive index which provides confinement of the optical mode to the waveguide region with an overlap of the optical mode into the clad regions of no greater than 5%.

5. The semiconductor laser diode of claim 4 in which the means for generating photons in the waveguide region includes at least one quantum well region.

6. The semiconductor laser diode of claim 5 in which the means for generating photons in the waveguide region includes a plurality of spaced quantum well regions with a barrier region between each pair of adjacent quantum well regions.

7. The semiconductor laser diode of claim 5 in which the clad regions are of a semiconductor material having a lower index of refraction than the materials of the portions of the waveguide region adjacent the clad regions.

8. The semiconductor laser diode of claim 7 in which the portions of the waveguide region on each side of the quantum well region is of a semiconductor material having a bandgap larger than that of the quantum well region.

9. The semiconductor laser diode of claim 8 in which the portion of the waveguide region on each side of the quantum well region is of uniform composition throughout its thickness.

10. The semiconductor laser diode of claim 8 in which each of the portions of the waveguide region on each side of the quantum well region has an inner portion adjacent the quantum well region which has a bandgap greater than the quantum well region and an outer portion adjacent the clad region which has a bandgap greater than that of the inner portion.

11. The semiconductor laser diode of claim 8 in which the portion of the waveguide region on each side of the quantum well region has a graded composition.

12. A semiconductor laser diode comprising:

a body of a semiconductor material having top and bottom surfaces and opposed end surface;

a waveguide region in the body extending across the body between the end surfaces, said waveguide region being not intentionally doped and being of a material which substantially confines photons therein and allows the flow of photons therealong;

means in the waveguide region for generating an optical mode of photons;

a first clad region of one conductivity type between the waveguide region and the top surface of the body; and

a second clad region of the opposite conductivity type between the waveguide region and the bottom surface of the body;

said photon generating means being thinner than the thickness of the waveguide region and being spaced from the clad region;

the thickness of the waveguide region and the composition of the waveguide and clad regions being such that the generated optical mode does not overlap into the clad regions from the waveguide region more than about 5%.

13. The semiconductor laser diode of claim 12 in which the waveguide region is of a thickness of at least 500 nanometers.

14. The semiconductor laser diode of claim 13 in which the waveguide region has a doping level of not greater than about $5\times10^{16}/cm^3$.

15. The semiconductor laser diode of claim 14 in which the materials of the waveguide region and the clad regions have a refractive index which provides confinement of the optical mode to the waveguide region with an overlap of the optical mode into the clad regions of no greater than 5%.

16. The semiconductor laser diode of claim 15 in which the means for generating photons in the waveguide region includes at least one quantum well region.

17. The semiconductor laser diode of claim 16 in which the means for generating photons in the waveguide region includes a plurality of spaced quantum well regions.

18. The semiconductor laser diode of claim 16 in which the clad regions are of a semiconductor material having a lower index of refraction than the materials of the portions of the waveguide regions adjacent the clad regions.

19. The semiconductor laser diode of claim 18 in which the portions of the waveguide region on each side of the quantum well region is of a semiconductor material having a bandgap larger than that of the quantum well regions.

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